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ABSTRACT

This preliminary report of a project in progress--the creation of an alternate research guide for educational technology--begins by noting the influence of early ties to behavioral psychology and systems theory on research in the field and recent recommendations by researchers and scholars that the field be broadened to include such non-experimental approaches as ethnographic, descriptive, historical, and analytical methods. The five steps that will be followed to complete the study are then outlined, and work completed on the first two steps of this methodology is reported, i.e., a review of the last decade of instructional technology research, and a survey of materials, texts, compiled readings, etc., used by major educational technology academic programs in their research courses. The research review focuses on topic areas, methodologies, and research questions. The responses from the 19 universities (out of 30 selected for participation) and one corporate center that responded to the survey questionnaire are summarized, including current research topics being investigated in both experimental and non-experimental studies. The next steps in the project are briefly discussed, including a review of the research from 1976 to 1986 that will provide a more detailed look at the current state of research in instructional technology; a review of the research topics and methodologies, purposes, results, and recommendations for the last several years; and a discussion of the proposed paradigm shift, the alternate methods it would necessitate, and the various data gathering techniques available to researchers. Three tables provide data on the findings of the literature review, and a copy of the survey questionnaire is appended. (7 references) (EW)

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Naturalistic Inquiry in Educational Technology

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Abstract

The field of educational technology developed in the 1940's out of several theoretical constructs, including perception, communication, and the psychology of learning. The basis of the primary research in educational technology was a combination of behavioral psychology and systems theory. Because of this early orientation, most research in educational technology from 1940-1980 followed experimental paradigms which attempted to show causality and/or relationships in testing the effectiveness of visual media for instruction.

More recently, researchers and scholars in educational technology have recommended widening the field to include more diversity of method and topics for study. Current researchers and educational technology doctoral students are being encouraged to investigate new questions and to consider various alternative methods of investigation. Ethnographic, descriptive, historical, and analytic methods are all being recommended to help answer questions involving how any given medium is structured to make meaning, how a medium makes its impact, and what the scope of the impact has been.

This study explores some current areas of research in educational technology and defines the non-experimental research methods which can appropriately be used to investigate these topics. If new questions are to be researched in non-traditional ways, scholars need guidance and assistance to create a new thrust of programmatic research in educational technology. The proposed continuation of this study could result in a reference guide which compiles research topics, methods, and sample studies to provide the guidance needed.

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Introduction

Emerging as a separate field in the 1940's, Educational Technology drew upon theory bases from psychology, learning, and perception. The field was derived primarily from behavioral and cognitive psychology, and consequently based its seminal research on strict experimental models appropriate to the early questions and hypotheses developed. Media was tested experimentally, and found (at the time) to be effective.

In the forty years of research that followed, the same experimental paradigm predominated. New media were tested against old, characteristics of learners and specific media were compared, and relationships between learners and media were explored, all using various accepted experimental designs.

More recently, the field has broadened its definition to include instructional design, media analysis, and learner attitudes among other topics. Researchers are asking a variety of new questions, many of which would be difficult to examine using traditional experimental methods.

Background and Rationale

Currently, most of the published scholarship in educational technology has been based upon experimental and descriptive studies. The leading researchers, those who train future scholars in research methods, have only recently begun to accept a full range of research methodologies for educational technology. Consequently, educational technology journals publish few studies based upon non-experimental designs. Since reports of alternate methodologies are few, researchers in educational technology have only the models of research reports in other fields to assist them in research design and reporting.

The experimental "bias" in educational technology has been questioned by many researchers seeking to expand the areas of scholarship in the field. Becker (1977) recommended alternate methodologies to approaching educational technology research. Cochrane, et al. (1980) suggested that researchers base new areas of inquiry on "the ethnography of situations in which people use visual materials (an anthropological approach)" (p. 247). They stressed the importance of recognizing that visual learning is a cultural phenomenon and should be studied with techniques and analyses appropriate to cultural processes. Heinich (1984) in his N.I.E. funded ten year review paper encouraged researchers to engage in more "naturalistic" inquiry. "Through the use of naturalistic inquiry, I am sure we will discover important factors ... that have been ignored too long ..." (p. 84). Heinich also argued that such research should be encouraged in dissertation work and should be more disciplined and more perceptive than experimental studies.

Alternative methodologies would lead the field of educational technology to new questions, and to often ignored areas such as the impact of educational technologies on social relationships and educational institutions. Kerr (1985) suggested that methods drawn from sociology, policy sciences, and anthropology could "shed new light on problems that have traditionally been approached using psychological research methods" (p. 4). Kerr felt that asking new questions in less traditional ways was critical to the future of education.

With such recommendations for alternative methods, why has the field not adequately responded? In a symposium presentation at the 1986 Association for Educational Communication and Technology Conference, Becker, Heinich, and other researchers offered their explanations: Many strong researchers believe experimental research is vital and best; most new scholars are encouraged to design only experimental studies; alternate methodologies are fairly unfamiliar to the field and so are less acceptable to dissertation directors and journal editorial boards; and studies which employ case or ethnographic methods are more difficult to synthesize into a journal length format. This same panel recommended research using philosophical, historical, and developmental inquiry, semiotic and content analysis techniques, and several anthropological methods including case study and participant observation.

In summary, psychological, experimentally based research has formed the basis of educational technology scholarship. Recent developments in research and theory generation have resulted in recommendations for new question areas and alternate research methodologies. For several years, such suggestions have been proffered, and attempts to follow them have been reported. Symposia featuring non-experimental reports have been presented at the Conference of the Association for Educational Communications and Technology (McIsaac, Robinson, and Koetting, 1984) and elsewhere, but the methods recommended have not gained widespread use or familiarity.

There are numerous books available which detail research designs and statistical procedures. Merrian and Simpson (1984) have added to the usual texts by presenting a "full range of methodology for doing research, and by supporting points with examples from research studies done with adults in adult settings" (p. iii). It is just this sort of reference which is required by educational technology researchers to encourage and guide them to new techniques. The problem areas and theory basis of educational technology needs to be expanded, and a reference guide could provide motivation and assistance.

Purpose

This project will, when completed, have followed several steps necessary to the creation of an alternate research guide for educational technology researchers. It will, specifically:

- review the types of research recommended for future educational technology issues and concerns;

- review the non-experimental methodologies recommended by many scholars to enhance educational technology research;

- describe and discuss reported studies which have used non-experimental research techniques in educational technology;

- develop guidelines for theory, issues, and research questions appropriate to non-experimental educational technology research; and

- seek out and develop examples or models of studies utilizing alternate methods, and discuss their reportage.

Methodology

The procedures necessary to the completion of this study include the following:

1. A review of the last decade of instructional technology research would concentrate on problem areas, topics, and appropriate questions as well as research designs. As noted in the background section, several scholars have been reviewing and critiquing the educational technology research literature. Direction would be taken from their recommendations for future educational technology research.

2. A survey of materials, texts, compiled readings, etc. used by major educational technology academic programs to help students gain research skills in their field would be conducted. University programs willing to cooperate in such a compilation would be asked to respond to a survey (see Appendix 1).

3. A review of recommended alternate methodologies, including their definitions, advantages and disadvantages, and appropriate implementation. Texts such as Isaac and Michael (1981) and Merriam and Simpson (1984) would be drawn from and a bibliography for further study would be recommended.

4. A discussion of the emerging problem areas for educational technology research would be synthesized, and the appropriate methods for their investigation would be recommended.

5. Several (6-8) recent studies would be located as models' of reported non-experimental educational technology research.

With these purposes and methods in mind, a report of the first two steps in the methodology of this project follows. This is a preliminary report of a work in progress, with the expectation that others hearing or reading the report will offer ideas, suggestions, argument, or research articles to provide models for others.

Review of Research, 1976-1986

An examination of articles published in ECTJ and JID for this period was undertaken with three major focus points: topic areas, methodologies, and research questions. Also of interest were the discussion sections, especially the areas of recommended future research. These focus areas will after further review provide the answers to several questions, such as: what has been the research in educational technology? What methodologies have been chosen to answer what questions? Which topics have attracted the most research, and what

areas have been recommended for more investigation? What conclusions can be drawn about the use of experimental and "alternate" methods of research in educational technology?

First to emerge were subject areas which allowed the organization of this compilation of our recent research history. The following areas emerged, as they have been defined and exemplified.

1. Visual Literacy - includes studies on visual cuing strategies, physiological effect of cuing (e.g. scanning behavior, eye movement); various pictorial attributes, effects of visualization, and individual differences variables (picture-style preferences, picture-interpretation behavior of children).
   Example of study: Responsiveness of Nigerian students to pictorial depth cues.

2. Instructional Development - includes studies which addressed and/or have implications for instructional media design/development; studies which developed models for message design, presentation, production and instructional methods/approaches.
   Example: Supplementing traditional instruction with objective-based instructional development.

3. Computers - CAI, CBI, computers in education and industry.
   Example: Computer-based foreign language instruction: Improving student attitudes.

4. Learning Strategies - studies on mnemonic strategies, imagery, and other learning or cognitive strategies such as rote and networking; visual and verbal information processing.
   Example: Information processing from screen media: a psycholinguistic approach.

5. Learner Characteristics - types of learners, learner preferences, motivation, orientation, abilities, attitudes, etc.
   Example: Interaction between student achievement orientation, locus of control, and two methods of college instruction.

6. Media Utilization/Attributes - media symbol systems, coding, media use in education, media selection.
   Example: A survey of school teachers' utilization of media.

Certainly there may be some other possible topic areas, or alternate definitions; however, those chosen were considered valid and helpful for our discussion.

Tables 1, 2, and 3 review the number of articles reviewed, by topic and by methodology. (insert tables about here). As shown, the most common topics were computers in education, instructional development, visual literacy, media attributes/utilization,and learning strategies. As expected, experimental research was by far the most prevalent, with any of the other methods cited only rarely.

Of non-experimental methods, the most often used was survey, and surveys were most often found necessary in the topic area of computers. Perhaps with the introduction of a fairly new technology, surveys were necessary to determine use patterns and adoption practices. The topic area that was investigated using the widest range of methods was instructional development. While most research reports cited experimental method, case/field study, survey, and descriptive methods were also used. The delphi technique, naturalistic methods, and evaluation studies as well as theory development were also reported.

Overall, the review of research topics and methodologies provided few surprises. Experimental methods were used most often, and were reported in all topic areas except mass media and training. "Qualitative" research methods were much more rare. Descriptive, historical and philosophic approaches, the more commonly accepted methods, accounted for only 12 research reports. Case/field study, delphi, and naturalistic methods were cited in only 18 studies. The experimental models were obviously found to be the most useful and viable for the last 10 years.

Survey Results

The survey was introduced at the annual P.I.D.T. conference in Bloomington, Indiana, and the mailing list for the meeting was used for initial selection of respondents. The A.E.C.T. Human Resources directory was also consulted, as was the Educational Media Yearbook. Of the almost 60 university programs offering master's and doctoral degrees, 30 were selected for participation in this survey. In addition, a letter of intent and the survey were published in the R.T.D. Newsletter, with an open request for information from other programs.

Of this representative group, twenty surveys were returned, 19 from university programs and one from a corporate training center. Responses herein discussed were from these programs: Arizona State, Brigham Young, Colorado-Denver, Florida State, Indiana, Iowa State, Kent State, Manitoba, Minnesota, Oklahoma, Ohio State, Pennsylvania State, Texas A & M , and Washington, among others.

The six questions on the survey were intended to elicit information about the research course requirements in the program, the research methods taught, the books used, the expectations of the department (if any) as to type of research encouraged, and the current topics being researched by faculty and students at the institution. A copy of the survey is included as Appendix 1. The survey was useful in a number of ways. First, it served to call attention to this area of interest, non-experimental research, and discover what interest and expertise other faculty have in the area. Second, it provided a list of texts currently used or recommended for teaching research skills. Third, it revealed that, while encouraging students to conduct research using "whatever method appropriate to their question", most programs responded negatively to current research being done using non-experimental methods. There were several responses that declared interest in this topic, but very few that displayed much expertise or practice with the "alternate" methods of conducting research or even posing questions.

Specifically, then, the survey provided the following responses. All programs responding had required research courses for doctoral students, and

many had such courses for master's students as well. Most of these courses were taught by faculty other than instructional systems faculty, usually in the educational psychology program. Consequently, respondents' familiarity with the course content was not as instructor nor designer of these courses. Eight programs had their own course or courses in instructional systems research, usually seminars for doctoral students. Texts required for these basic research courses included those by Kerlinger, Borg and Gall, McMillan and Schumacher, Dwyer, Best, and Tuckman.

Of the programs responding to question 3., only eight had a separate course or unit highlighting non-experimental research methods. Texts used in these courses included those by Bogdan and Bikleu, Miles and Haberman, Spradley, Patton, Willis, and Guba and Lincoln. These texts consider qualitative research in education, naturalistic inquiry, and ethnographic methods of research.

Almost all programs responded that students are encouraged to conduct research appropriate to their question, but ten programs encourage experimental methods first, and seven programs responded that they encourage "alternate" methods. Many programs reported that students are advised to seek out courses in other university departments which could assist them in gaining skills in non-experimental research, such as anthropology or sociology. Only one program had a full course in "alternate" methods, a seminar at Florida State. Other programs such as the one at N.I.U. reported that students in instructional systems seminars are provided materials and readings in non-experimental research since the required educational psychology research courses teach them experimental methods and statistics.

Several programs listed current research topics being investigated in both experimental and non-experimental studies. These included:

experimental:
- videodisc instruction
- persuasion and media
- model and theory building
- expert systems
- effects of CAI
- computerized testing

non-experimental:
- use of distance technology
- effects of microcomputers on student interaction
- importance of university film and video collections
- reactions to high school classes taught by satellite
- computers in higher education
- television production
- dissemination of technology
- product development and evaluation, techniques and model development.

Methodologies for these non-experimental studies included survey, delphi technique, meta-analysis, case study, participant observation, literary criticism, film criticism, interview, and multiple qualitative methods. The list was a substantial enough one to expect that some of these studies would derive information reportable at conferences and publishable in future journal volumes. From these responses it could be summarized that the interest in "alternate"

methodologies is substantial and possibly increasing. Several respondents remarked that faculty or students were interested but unfamiliar with such research. "I think the more naturalistic approaches are much more suited for instructional technology than the harder, quantitative ones," is a quotation that characterizes such interested respondents. Overall, the survey provided the expected information: lists of courses, one syllabus, several text recommendations, and topic areas currently being investigated both experimentally and non-experimentally. Interest in the "alternate" methodologies was also evident from the responses.

With sections one and two of the methodology of this project having been discussed, the question is, what next? Obviously, a more thorough review of the currently reported topics and methodologies will reveal the questions and the results of the research reviewed (1976-1986). This review will provide a more detailed look at the current state of research in instructional technology: the purpose, the results and the need for future research.

Also, this ten year review will summarize the recommendations made in the several "review" or "critique" articles which have critically analyzed the research over the last ten years and made suggestions for future topic areas and methodologies. These articles should prove useful for the development of a list of topic areas and emphases considered appropriate for the future.

In addition to the above review of research, a review of the topics and methodologies, purposes, results, and recommendations will be completed for the last several years using Dissertation Abstracts and the R.T.D. Proceedings as primary sources. When these steps are completed, a fairly total picture of the current research should be drawn. Topic areas, methods, questions, results, and future recommendations when compiled will provide a clear picture of the current state of research in instructional technology. The consideration of future topics and methods can be then situated in a full review of the recent past.

Another, more controversial step also remains in this project. A discussion and definition of available "alternate" methods of research must also include the question of the prevailing paradigm under which our research is conducted. There is a large difference between recommending surveys or interviews or even observation and recommending that the field consider a paradigm other than the scientific paradigm now guiding our research. Several presentations at our A.E.C.T. conferences have made clear the need for the field to grow in new directions; a growth made possible only by the posing of essential questions in new frameworks. A new science model has been recommended, as has an artistic model (Eisner) or a semiotic model (Barthes), among others. This question of paradigm shift must be discussed and resolved as we move into the 1990's and our research moves into new areas.

The non-scientific paradigm can be productively used to develop new areas and methods of research in instructional technology. Methods such as linguistic analysis, phenomenology, case study, grounded theory, action, participation, observation, and simulation can all be "borrowed" from other, well-defined and developed disciplines and applied to our field. These methods are not considered "soft" in other fields, and have as their advantage the development of breadth and depth of research not possible in the experimental methods.

The survey and research review both showed an increased interest in non-experimental research. Less clear is the acceptance of a true paradigm shift in instructional technology research. A different type of question could and should be posed, according to many in our field. This project proposes, when finished, to discuss both the paradigm shift, the "alternate" methods it would necessitate, and the various data gathering techniques available to researchers, regardless of the paradigm being used. It is hoped that through the completion of this project, enough evidence of quality research methodologies, topics, and questions will be derived to provide future researchers, and the professors who teach them, with helpful guidelines to alternative research in our field.

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Table I

Years	Number of Studies Reviewed													
	Visual Literacy	Instruc. Development	Computers	Film	TV	Video	Learner Charac.	Learning Strategies	Media Util./ Attributes	Research in Ed Tech	Mass Media	Ed. Tech. as Field	Training
1977-1982	25	31	-	3	5	-	9	13	12	2	1	-	1
1983-1987	6	23	41	-	-	4	6	11	15	1	-	3	3
Total	31	36	41	3	5	4	15	24	27	3	1	3	4

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Table 11

Research Methodologies Employed

Areas	Historical	Descriptive	Survey	Case/Field	Causal-Comparative	Quasi-Experim.	Exploratory/Pilot	Experimental
Visual Literacy					1		3	21
Instructional Development	1	4	5	7				24
Computers		1	14	4		1		16
Film								3
TV	1							5
Video							1	3
Learner Characteristics			1			1	2	11
Learning Strategies		3	1					19
Media Utilization, Attributes			3		1		1	21
Research in Educ. Tech.			1			1		
Mass Media			1					
Educ. Tech. as a Field			1					
Training			2	1				

Table III

Research Methodologies Employed

Areas	Correlational (Factor Analytic)	Delphi Technique	Meta-Analysis	Evaluation	Theory Development	Naturalistic	Bibliometric Analysis	Philosophical
Visual Literacy	1		1		3			
Instructional Development		2	1	2	2	2		
Computers				2		1	1	
Film				1				
TV				1	1	1		
Video					1			
Learner Characteristics								
Learning Strategies								
Media Utilization, Attributes		1	1					
Research in Educ. Tech.					1			
Mass Media					1			
Educ. Tech. as a Field								2
Training				1				

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Appendix I

Rhonda S. Robinson
N.I.U.

Name _____

University _____

Naturalistic Inquiry in Educational Technology

Recently, researchers and scholars in educational technology have recommended widening the field to include more diversity of method and topics for study. We are being encouraged to investigate new questions and to consider various alternative methods of investigation. Ethnographic, descriptive, historical, and analytic methods are all being recommended to help answer questions involving how any given medium is structured to make meaning, how a medium makes its impact, and what the scope of the impact has been. If new questions are to be researched in non-traditional ways, scholars need guidance and assistance to create a new thrust of programmatic research in educational technology. My work will result in a reference guide which compiles research topics, methods, and sample studies to provide the guidance needed.

This proposed project (full proposal available upon request) requires information from the varied programs around the country teaching research skills. Your help is greatly appreciated.

Please answer for your program, to the best of your knowledge.

1. Is there a separate course or unit which discusses research methods?
   Name of course? Enrollment?

2. Does this course survey several research methods?
   What text(s) are required? Recommended?

3. Is a separate course or unit taught which highlights non-experimental research methods? Which methods are included? What text(s) are used? Who teaches this course?

4. Are masters or doctoral students encouraged to investigate questions experimentally? Are "alternate" inquiry methods encouraged?

5. Have any students recently completed studies which employed alternate research methods? Topics explored? Methods chosen?

6. Please list the research topic(s) or area(s) currently being explored by yourself and/or your students. Include research methodology utilized.

As some of you are aware, I am undertaking a study on research methodologies in educational technology. My goal is to create a reference text which compiles research topics, methods, and sample studies for scholars who may want to use non-traditional research methods in their investigation of new questions in educational technology. In this regard I am conducting a survey of academic programs that teach research skills. If you have not already participated, please provide the requested information pertaining to your program (survey follows). Your help in this survey is highly appreciated.

Please return the survey to me at the address below. Thank you for your professional cooperation.

Sincerely,

Rhonda

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Enclosure